Name: Date:

Exam: Function Reflections (Solution version 1)

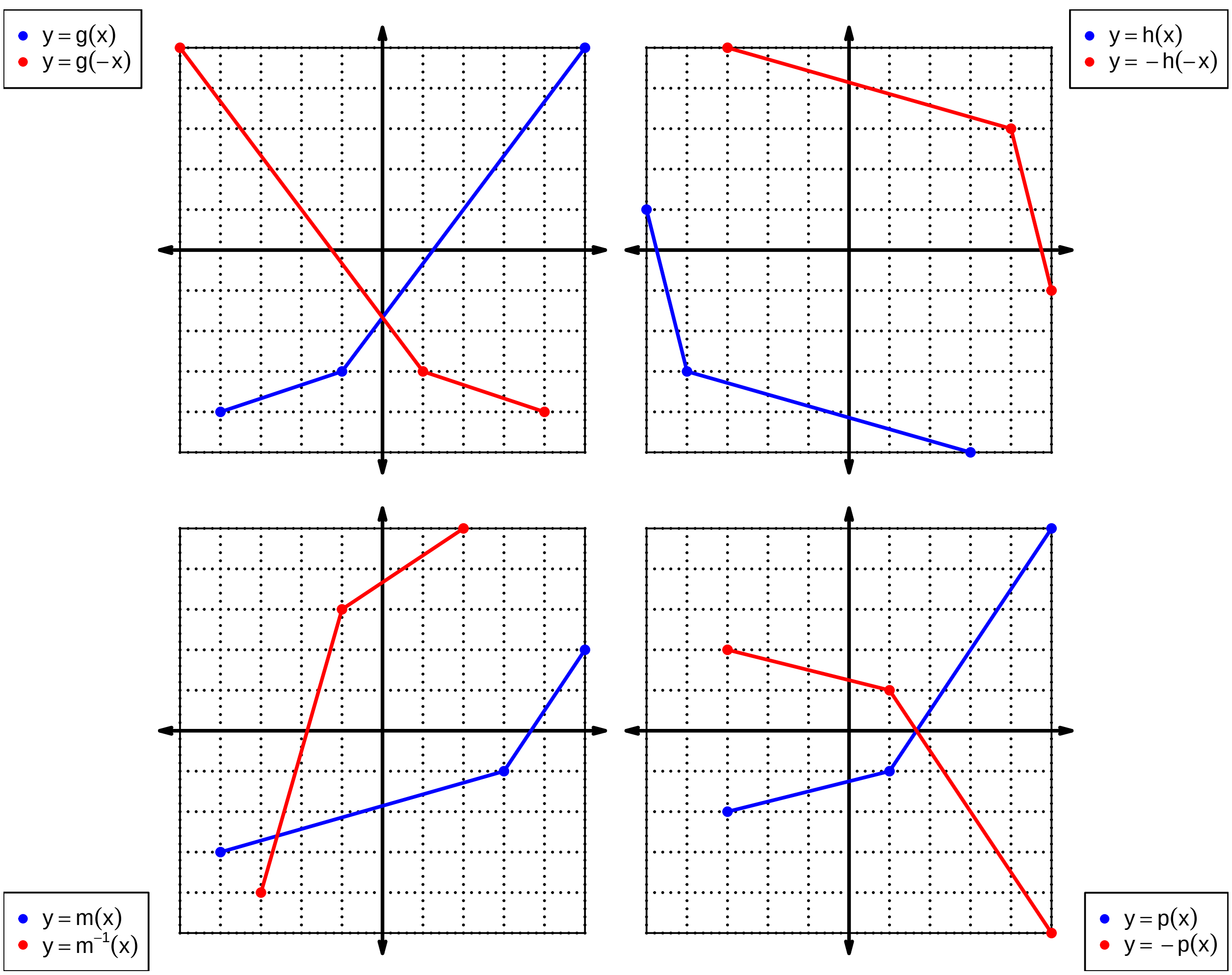
1. Let function f be defined by the polynomial below:

$$f(x) \;=\; -5x^4 - 8x^3 + 2x^2 + 3x - 7$$

Draw lines that match each function reflection with its polynomial:

Reflections	Polynomials
$-f(-x)$	$-5x^4+8x^3+2x^2-3x-7$
$f(-x)$	$5x^4+8x^3-2x^2-3x+7$
$-f(x)$	$5x^4-8x^3-2x^2+3x+7$

2. In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



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For all questions on this page, the functions f, g, and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	8	3	4
2	3	5	1
3	9	8	7
4	4	6	9
5	7	7	3
6	1	4	5
7	2	9	6
8	5	2	8
9	6	1	2

3. Evaluate $h(6)$.

$$h(6) = 5$$

4. Evaluate $f^{-1}(3)$.

$$f^{-1}(3) = 2$$

5. Assuming g is an **odd** function, evaluate $g(-4)$.

If function g is odd, then

$$g(-4) = -6$$

6. Assuming f is an **even** function, evaluate $f(-7)$.

If function f is even, then

$$f(-7) = 2$$

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7. A function, f, is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g, is **odd** if $g(x) = -g(-x)$ for all x in the domain.
   Let polynomial p be defined with the following equation:

$$p(x) \;=\; -x^2 + 1$$

   a. Express $p(-x)$ as a polynomial in standard form.

$$\begin{aligned} p(-x) &= -(-x)^2 + 1 \\ p(-x) &= -x^2 + 1 \end{aligned}$$

   b. Express $-p(-x)$ as a polynomial in standard form.

$$\begin{aligned} -p(-x) &= -\left(-x^2 + 1\right) \\ -p(-x) &= x^2 - 1 \end{aligned}$$

   c. Is polynomial p even, odd, or neither?

   even

   d. Explain how you know the answer to part c.

   We see that $p(x) = p(-x)$ for all x because $p(x)$ and $p(-x)$ are equivalent polynomials. Thus function p satisfies the criterion for being an even function.

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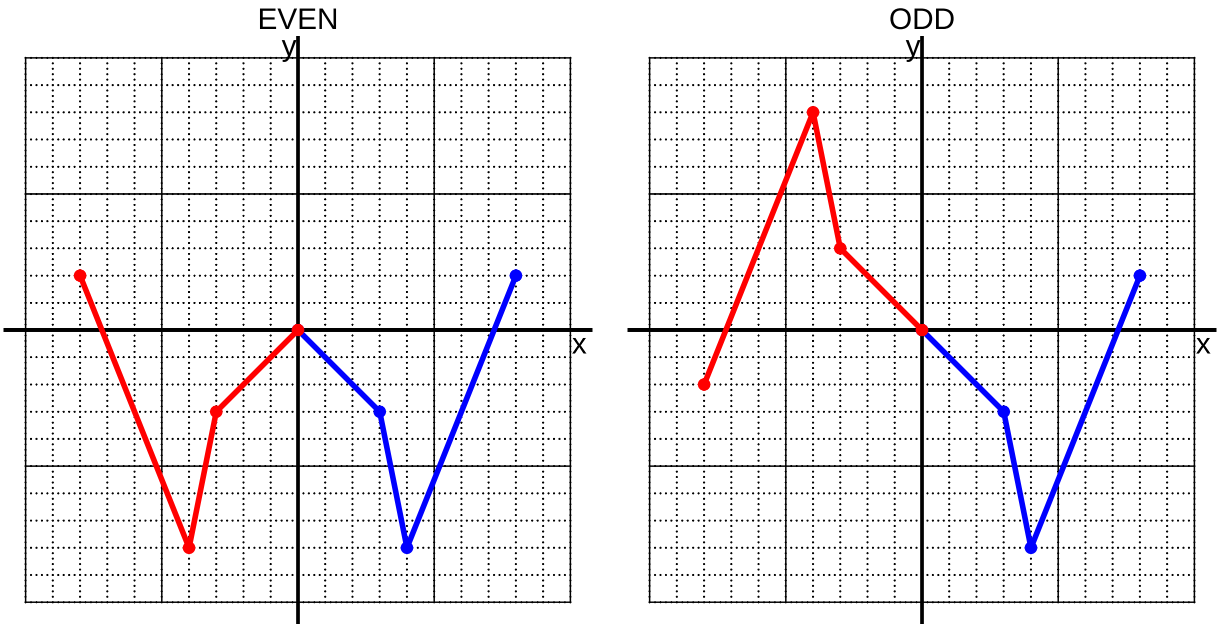
8. I have drawn half of a function. Draw the other half to make it even or odd.



9. Let function f be defined with the equation below.

$$f(x) = \frac{x-2}{5}$$

a. Evaluate $f(67)$.

step 1: subtract 2
step 2: divide by 5

$$f(67) = \frac{(67)-2}{5}$$
$$f(67) = 13$$

b. Evaluate $f^{-1}(12)$.

step 1: multiply by 5
step 2: add 2

$$f^{-1}(x) = 5x+2$$
$$f^{-1}(12) = 5(12)+2$$
$$f^{-1}(12) = 62$$

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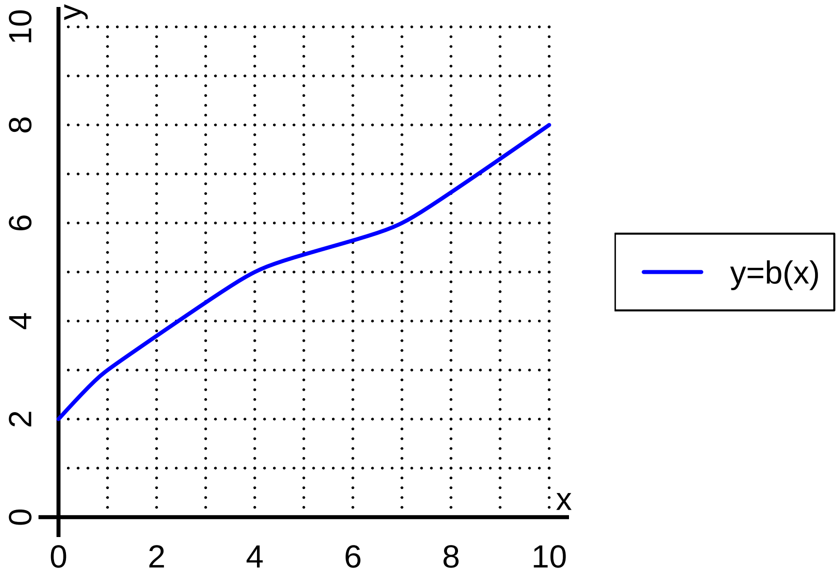
10. The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(4)$.

$$b(4) \;=\; 5$$

b. Evaluate $b^{-1}(6)$.

$$b^{-1}(6) \;=\; 7$$

Exam: Function Reflections (Solution version 1)

11. Function f is defined by the table below.

    a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	6	-6	6	-6
-1	3	-3	-3	3
0	0	0	0	0
1	-3	3	3	-3
2	6	-6	6	-6

b. Is function f even, odd, or neither?

neither

c. How do you know the answer to part b?

Function f is neither because neither column $-f(-x)$ nor column $f(-x)$ matches column $f(x)$ exactly.